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Aoki, Ishida &amp; 81-3-5470-1911

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## PATENT ABSTRACTS OF JAPAN

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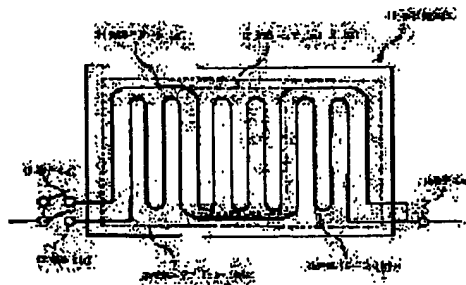
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## (54) HEATER FOR PRINTER

## (57)Abstract:

PROBLEM TO BE SOLVED: To provide an energy saving type heat roller capable of restraining wasteful power consumption by individually energizing heating parts divided to several as necessary in the heat roller constituted by arranging a surface heating element whose resistor is supported by an insulating body between the inner tube and the outer tube of a double tube consisting of metal or heat-resistant resin.

SOLUTION: In the heat roller where a surface heating resistor is arranged inside the tube, the wasteful power consumption is restrained by providing a plurality of heating areas and supplying minimum energy in accordance with heating width required for each paper to the paper having different width.



## LEGAL STATUS

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28. Feb. 2005: 15:55

Aoki, Ishida & 81-3-5470-1911

NO. 5107 2/P. 5/17

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28. Feb. 2005 15:56

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NO. 5107 1/P. 6/17:

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**CLAIMS**

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[Claim(s)]

[Claim 1] In the heater for printers at which the resistor arranges and constituted the planar heating element supported by the insulator between the inner tubes and outer tubes which consist of a metal or heat resistant resin, the exoergic section is divided into plurality and it is characterized by having structure which can be energized according to an individual.

[Claim 2] In the heater for printers at which the resistor arranges and constituted the planar heating element supported by the insulator between the inner tubes and outer tubes which consist of a metal or heat resistant resin, the polar zone which \*\*\*\*s to a roller lateral electrode from roller shaft orientations is characterized by having two or more contacts corresponding to two or more exoergic sections which can be set to claim 1, respectively.

[Claim 3] In the heater for printers of said claims 1 and 2, maximum electric power is switched on at the time of starting, a temperature up is carried out to temperature predetermined in a short time at it, and it is characterized by performing control for reducing power consumption -- switch on the minimum power for maintaining temperature and after the purpose termination of printing and others stops the electric power supply for heating -- at the time of actuation.

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28. Feb. 2005 15:56

oki, Ishida&amp; 81-3-5470-1911

NO. 51071/SP. 7/17

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**DETAILED DESCRIPTION**

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the heating roller for toner fixing in electrophotography equipments, such as a copying machine and a printer.

[0002]

[Description of the Prior Art] Generally, in the toner anchorage device in electrophotography equipments, such as a copying machine and a printer, the heating roller equipped with the exoergic means and a pressurization roller are arranged face to face, the recording paper which imprinted the toner image among these rollers is passed, heating and coincidence are pressurized, and heat fixing of the toner image is carried out at the recording paper.

[0003] As for the heating roller put in practical use from the former, what carried out the interior of the halogen lamp etc. to the interior of metallic pipes, such as aluminum and stainless steel, is in use.

[0004] In case heat fixing of the toner image is carried out, a halogen lamp is made to emit light, and a metallic-pipe internal surface is heated by the radiant heat, and conducts to the metallic-pipe front face and the toner.

[0005] The need power for making heat capacity small and heating it is lowered, or the approach which has arranged enough two or more halogen lamps which gave different luminescence energy distribution, and carries out them is taken so that thickness of tubing may be made thin, or the path of tubing may be made small as an approach of reducing fixing heat energy in such a system and heating area may be chosen corresponding to the form with which width of face differs.

[0006]

[Problem(s) to be Solved by the Invention] However, it is big minus in cost for an equipment manufacture manufacturer to arrange two or more lamps, in order to be unable to deny existence of the power loss of a reason and to make heating area selectable, although it is radiation heating as long as it is a halogen lamp.

[0007] But efficiency of energy use is gathered as a heating roller, or devising the policy for reducing power consumption according to an application is becoming the important technical problem which must be tackled as a trend of a time.

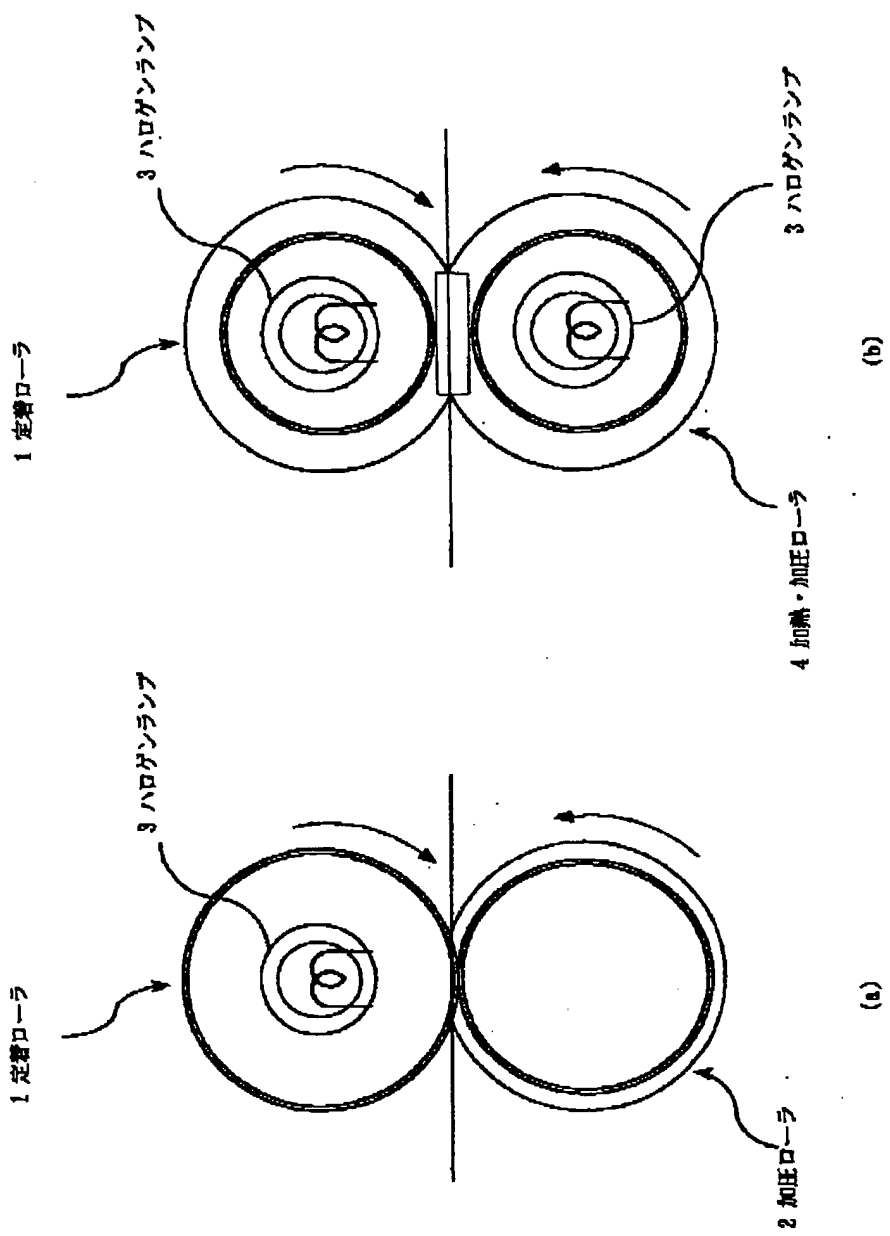
[0008]

[Means for Solving the Problem] Then, the degree of freedom of a design is large, and in the heating roller to which mass-production nature has also arrange a certain field-like exoergic resistor inside tubing, two or more exoergic fields of a planar heating element are prepare, the minimum energy according to heating width of face required for each is supply to the form with which width of face differs, and it enables it to hold down useless power consumption also in it paying attention to the direct heating method in which power-thermal-conversion effectiveness is most excellent.

[0009]

[Embodiment of the Invention] This invention relates to the heating roller for heating, and the equipment which used it.

Fig.1



~~[Drawing 3]~~

28. Feb. 2005 15:57

oki, Ishida&amp; 81-3-5470-1911

NO. 5107 1/P. 9/17:

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DRAWINGS

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[Drawing 2]

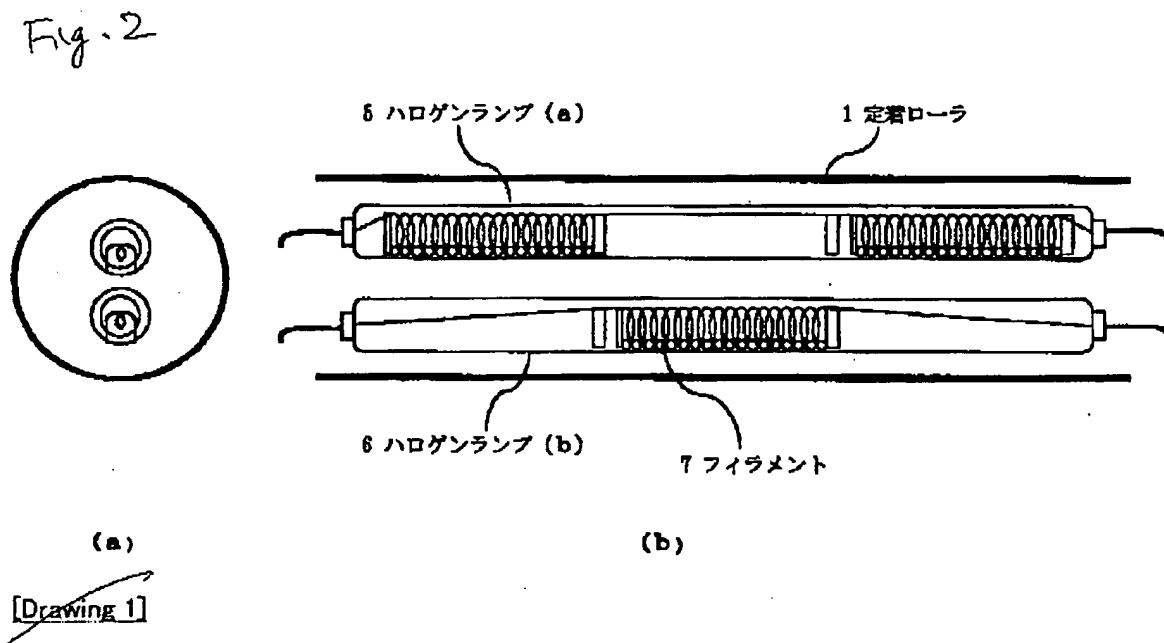
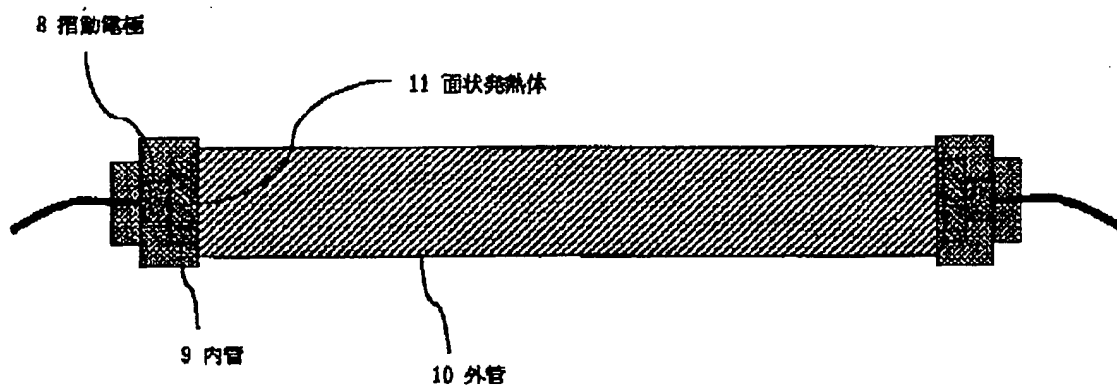
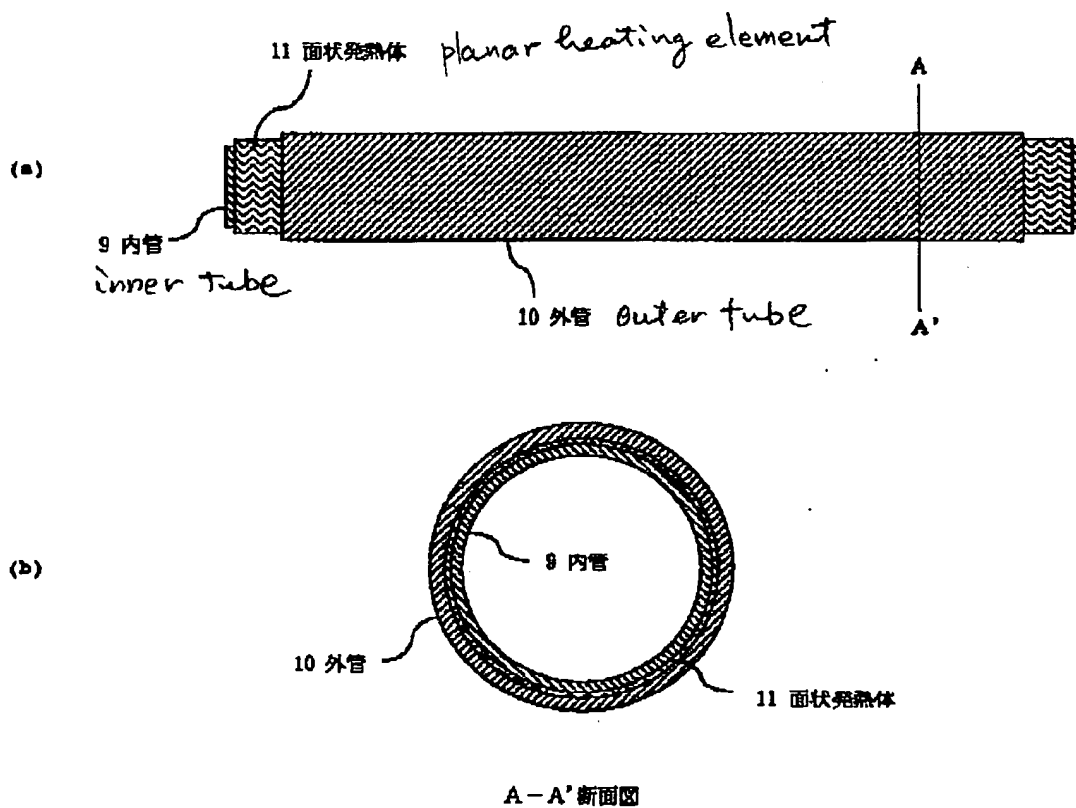


Fig.3



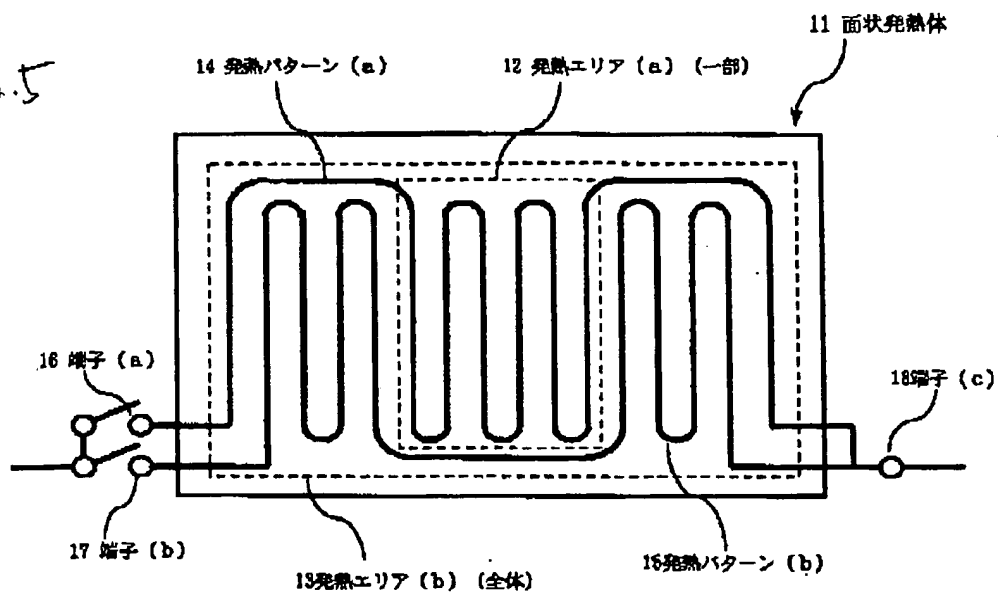
[Drawing 4]

Fig.4



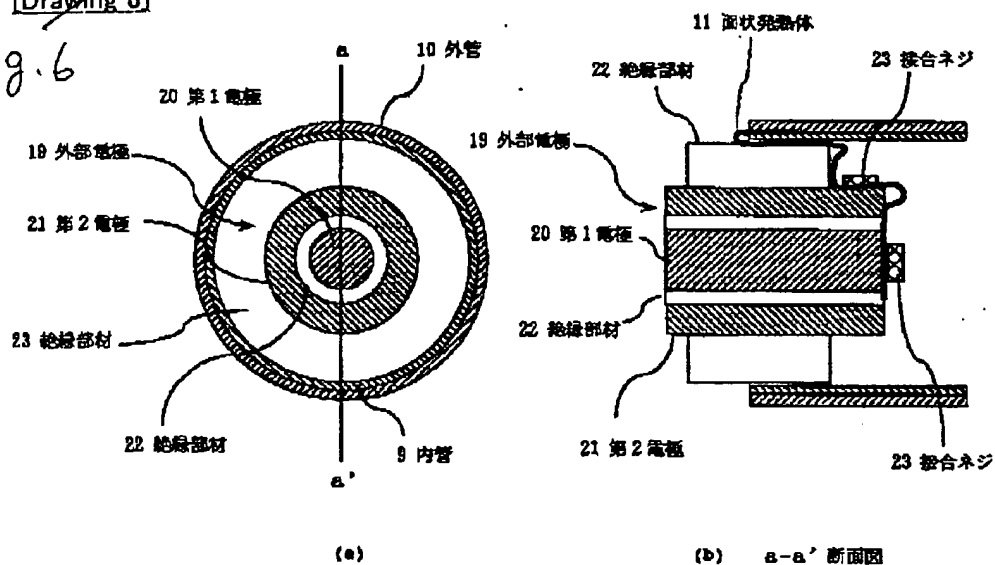
[Drawing 5]

Fig. 5



[Drawing 6]

Fig. 6



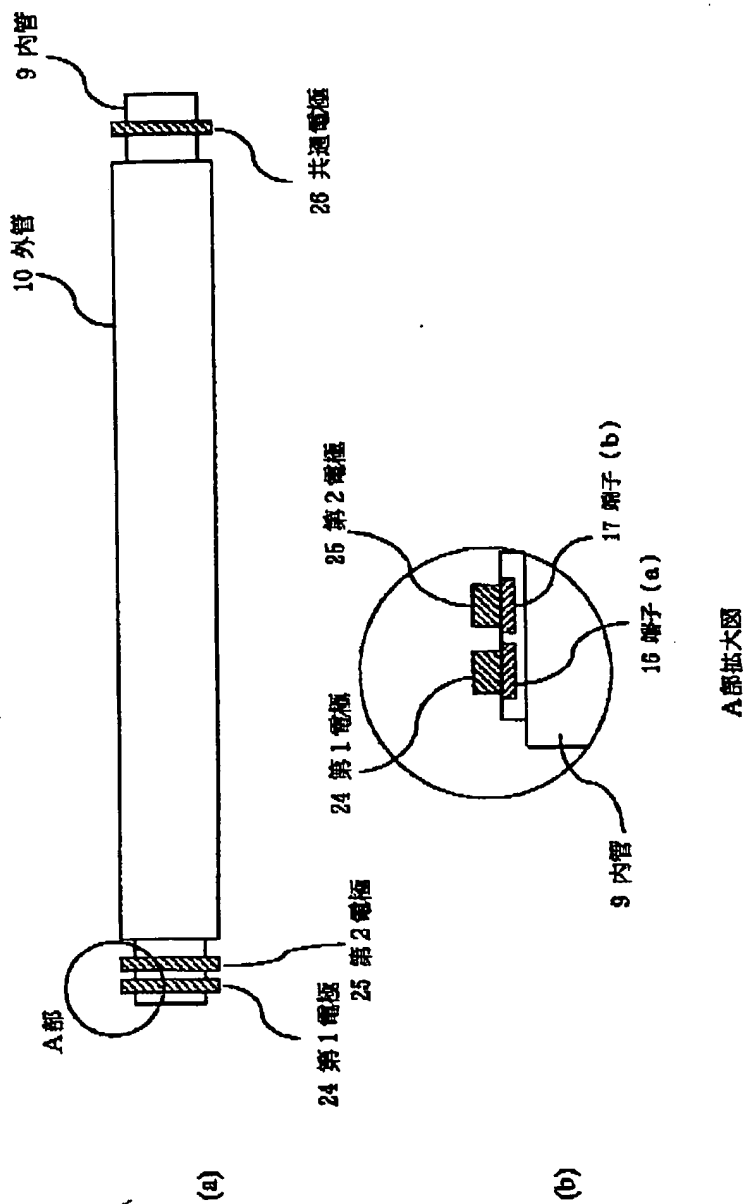
[Drawing 7]

28. Feb. 2005 15:57

Koki, Ishida& 81-3-5470-1911

NO. 51075/eP. 12/17

Fig. 7



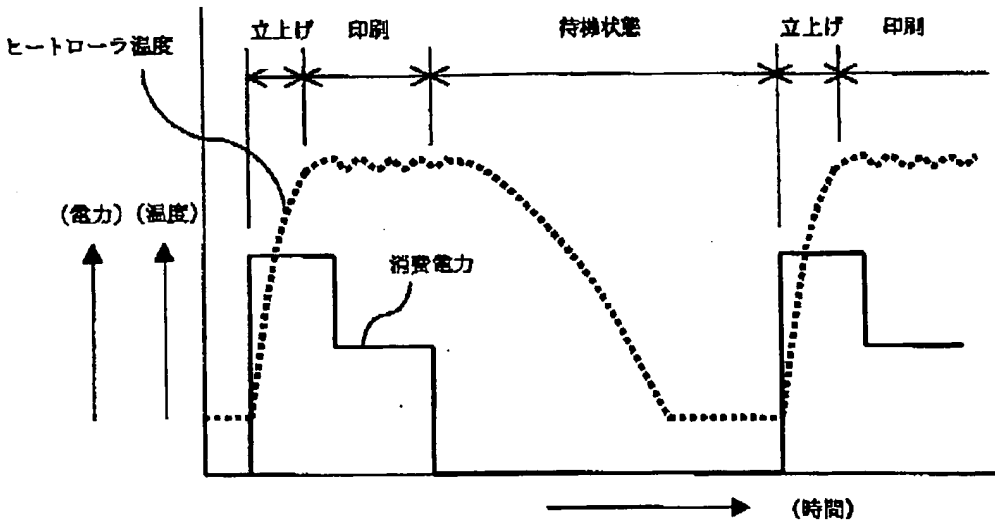
[Drawing 8]

28. Feb. 2005 15:58

Aoki, Ishida& 81-3-5470-1911

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Fig. 8



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28. Feb. 2005 15:58

Aoki, Ishida &amp; 81-3-5470-1911

NO. 51072/3P. 14/17

[0010] The gestalt of operation of this invention is explained using drawing below.

[0011] Drawing 1 is the sectional view of the general double roller fixing assembly as a toner anchorage device in electrophotography equipments, such as a copying machine and a printer. Fixing roller equipped with the exoergic means 1 and pressurization roller 2 is arranged face to face, the recording paper which imprinted the toner image among these rollers is passed, heating and coincidence are pressurized, and heat fixing of the toner image is carried out at the recording paper.

[0012] As a source of generation of heat, it is a halogen lamp. Both rollers may be heated as [ it is common that 3 is used, and / to gather the case where fixing energy is needed more, or a fixing rate ] shown in (b).

[0013] However, halogen lamp In order about 30% and exoergic effectiveness of 3 are bad and for a lost part by luminescence to carry out a temperature up to predetermined temperature required for heat fixing, dozens of seconds - several minutes are required, and a long standby time until it becomes usable from a idle state or a short rest condition is needed.

[0014] Moreover, in order to abolish the standby time, preheating must be carried out, and the useless energy which does not contribute to direct production must be consumed.

[0015] Furthermore, as it is shown in drawing 2 whether it is established by not being concerned with form width of face, but making full heat when printing in the form of different width of face Appearance filament with the heating field according to form width of face Two or more halogen lamps into which the consistency of 7 was changed are arranged in one roller. When heating full, it is a halogen lamp (a). 5 and halogen lamp (b) 6 is made to turn on and, in the case of a form with narrow width of face, it is a halogen lamp (b). It is needed to make only 6 turn on etc.

[0016] To the fault of such a conventional heating roller, this invention gathers efficiency of energy use, and shortens the build up time after switching on a power source, and a heating roller with more high added value, such as enabling selection of heating area within one heater, and the equipment using it are offered further.

[0017] Drawing 3 is the external view of the heating roller of this invention, and shows the structure to drawing 4.

[0018] This roller is an inner tube which consists of heat resistant resin, such as metals, such as aluminum, stainless steel, copper, and a galvanized steel sheet, or a carbon fiber, etc. 9 and outer tube It is a planar heating element among 10. 11 is arranged and it is a planar heating element. 11 is an inner tube. From 9 to an outer tube A pressure is put toward 10 and it is an inner tube. It is an inner tube by extending 9. 9 and outer tube It has stuck to 10.

[0019] Drawing 5 is an inner tube at drawing 3. 9 and outer tube Planar heating element arranged among 10 One gestalt in the condition of having developed 11 is shown.

[0020] Planar heating element 11 is a thin film-like heater and is covered with the organic material in which both sides of the exoergic section have flexibility like a heat-resistant insulating material, for example, polyimide.

[0021] The heating element is fabricated so that resistance may turn into a value of the request for which it opted beforehand and the temperature distribution at the time of generation of heat may become homogeneity. As the shaping approach, the method of performing baking processing etc. is after drawing by the press and etching of a metallic foil, or the pattern printing and the dispenser of resistive paste.

[0022] In order to prepare two or more heating fields, the exoergic section is divided into plurality and it enabled it to impress an electrical potential difference according to an individual in this invention, respectively.

[0023] If two or more heating fields are prepared although the conventional heating roller for fixing was heating the whole width of face and useless power was consumed even when printing a postcard with the equipment corresponding to A3, in the case of a postcard, if about about 1 of the cross direction / 3 are heated to predetermined temperature, it will be enough, and will be because the power which the other heating took can be reduced.

[0024] Exoergic pattern of drawing 5 (a) 14 and exoergic pattern (b) When carrying out parallel connection of 15 electrically and heating the whole surface, it is an exoergic pattern (a). 14 and exoergic pattern (b) If an electrical potential difference is impressed to 15, it will be exoergic

28. Feb. 2005 15:58

Aoki, Ishida &amp; 81-3-5470-1911

NO. 51073/P. 15/17

area (a). 12 and exoergic area (b) 13 is heated. When you want to heat only the exoergic area (a) 12, it is an exoergic pattern (a). An electrical potential difference is impressed only to 14.

[0025] If it does in this way, in order to heat an unnecessary part like before, the need of consuming excessive power will be lost, and, in the case of a narrow heating field, it can be managed with several  $[1/]$  of the power consumption of the whole. For example, power consumption is also set to one third, when a heating area is set to one third and it makes regularly power supplied there.

[0026] Drawing 6 shows the external electrode example (1) for supplying electric power to two or more exoergic patterns shown by drawing 5.

[0027] External electrode 19 is the 1st electrode. 20 and the 2nd electrode 21 is an insulating member. It has structure electrically insulated by 22 and is the 1st electrode. 20 The 2nd electrode Terminal shown in 21 by drawing 5 (a) 16 Terminal (b) Either of 17 is connected, respectively. In a common external electrode, it is a terminal (c) similarly. 18 is connected.

[0028] It is an external electrode in order for a sliding electric supply member like [ side / electric supply ] a carbon brush to perform an electric power supply to these external electrodes. The sliding electric supply member side corresponding to 19 also has same electrode block construction.

[0029] Drawing 7 shows an external electrode example (2).

[0030] The 1st electrode 24 and the 2nd electrode 25 is the terminal (a) which has structure which is a conductive ring-like member and was electrically insulated by the insulating member, and was shown by drawing 5. 16 Terminal (b) Either of 17 is connected, respectively. It is a common electrode similarly. In 26, it is a terminal (c). 18 is connected.

[0031] This ring-like conductivity member is stuck with the terminal by making itself transform. As one approach, it is the inner tube explained by drawing 3. From 9 to an outer tube A pressure is put toward 10 and it is an inner tube. It is a planar heating element by extending 9. It is an inner tube about 11. 9 and outer tube There are a process stuck to 10 and the approach of performing to coincidence.

[0032] Drawing 8 shows the power consumption of the heating roller of this invention, and the relation of roller temperature.

[0033] Time amount is shown on an axis of abscissa, and roller temperature and power consumption are shown on the axis of ordinate.

[0034] At the time of starting, performing control for reducing power consumption — switch on maximum electric power, carry out a temperature up to temperature predetermined in a short time, and after the purpose termination of printing and others stops the electric power supply for heating by switching on the minimum power for maintaining temperature at the time of actuation — is shown.

[0035] It becomes possible to offer the heating roller which was excellent in efficiency of energy use, and held down useless consumption by the above.

[0036]

[Effect of the Invention] According to invention of claim 1, the minimum energy according to heating width of face required for each is supplied to the form with which width of face differs, and the heating roller which can hold down useless power consumption can be offered.

[0037] According to invention of claim 2, the heating roller which can supply electric power from one revolving shaft can be offered to two or more exoergic sections of claim 1.

[0038] According to invention of claim 3, like [ at the time of starting ], when big power is required, in order to carry out a temperature up to predetermined temperature into predetermined time amount, after supplying sufficient power and reaching predetermined temperature, it lowers only to the power which can maintain minimum temperature, and the heating roller from which the whole power consumption is stopped by making power for heating into zero can be offered by hibernation.

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**DESCRIPTION OF DRAWINGS**

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**[Brief Description of the Drawings]**

**[Drawing 1]** The example of the conventional double roller fixing assembly

**[Drawing 2]** Halogen lamp

**[Drawing 3]** Heating roller external view

**[Drawing 4]** Structure of a heating roller

**[Drawing 5]** Planar heating element

**[Drawing 6]** External electrode example (1)

**[Drawing 7]** External electrode example (2)

**[Drawing 8]** Power consumption and roller temperature

**[Description of Notations]**

- 1 Fixing Roller
- 2 Pressurization Roller
- 3 Halogen Lamp
- 4 Heating / Pressurization Roller
- 5 Halogen Lamp (a)
- 6 Halogen Lamp (B)
- 7 Filament
- 8 Sliding Electrode Member
- 9 Inner Tube
- 10 Outer Tube
- 11 Planar Heating Element
- 12 Exoergic Area (a)
- 13 Exoergic Area (B)
- 14 Exoergic Pattern (a)
- 15 Exoergic Pattern (B)
- 16 Terminal (a)
- 17 Terminal (B)
- 18 Terminal (C)
- 19 External Electrode
- 20 1st Electrode
- 21 2nd Electrode
- 22 Insulating Member
- 23 Junction Screw
- 24 1st Electrode
- 25 2nd Electrode
- 26 Common Electrode


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NO. 5107 1/P. 17/17

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CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE  
INVENTION TECHNICAL PROBLEM MEANS DESCRIPTION OF DRAWINGS DRAWINGS

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